



Pump Division



***HWX***

***API 610  
Vertical In-Line  
Process Pumps***

***API OH3***

***Pump Bearing Frame***

***API OH4***

***Rigidly Coupled***

***API OH5***

***Close Coupled***

## **Pump Supplier To The World**

*Flowserve is the driving force in the global industrial pump marketplace. No other pump company in the world has the depth or breadth of expertise in the successful application of pre-engineered, engineered and special purpose pumps and systems.*

### **Pumping Solutions**

Flowserve is providing pumping solutions which permit customers to continuously improve productivity, profitability and pumping system reliability.

### **Market Focused Customer Support**

Product and industry specialists develop effective proposals and solutions directed toward market and customer preferences. They offer technical advice and assistance throughout each stage of the product life cycle, beginning with the inquiry.



### **Dynamic Technologies**

Flowserve is without peer in the development and application of pump technology, including:

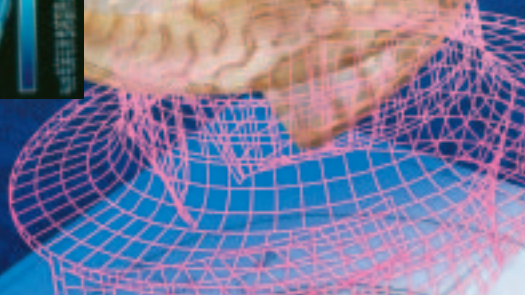
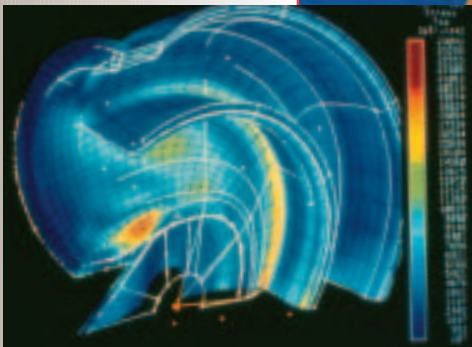
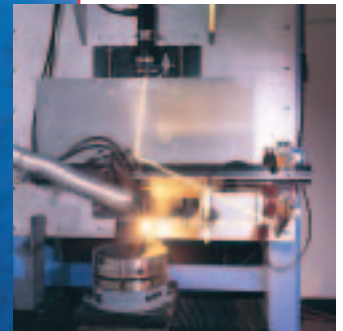
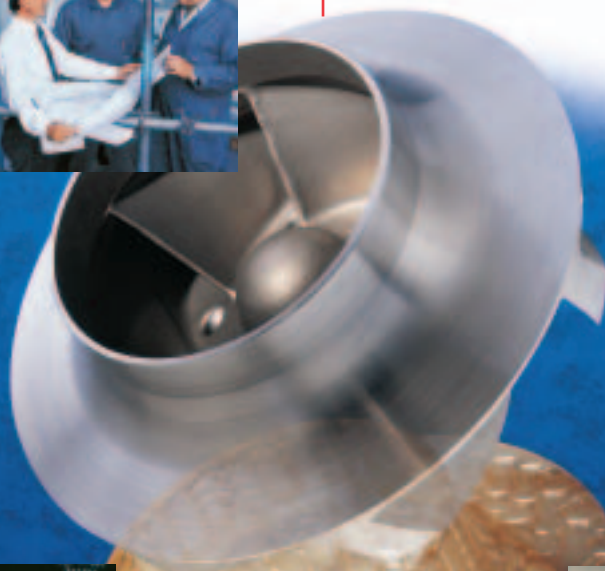
- Hydraulic engineering
- Mechanical design
- Materials science
- Intelligent pumping
- Manufacturing technology

### **Broad Product Lines**

Flowserve offers a wide range of complementary pump types, from pre-engineered process pumps, to highly engineered and special purpose pumps and systems. Pumps are built to recognized global standards and customer specifications.

Pump designs include:

- Single stage process
- Between bearing single stage
- Between bearing multistage
- Vertical
- Submersible motor
- Rotary
- Reciprocating
- Nuclear
- Specialty



**HWX**  
**API 610**  
**Vertical In-Line**  
**Process Pumps**

**First Choice for Vertical In-line Pumping**

The HWX pump is the API 610 latest edition type OH3, bearing housing design and space-saving in-line alternative for many overhung process pumps in upstream and down stream services.

The HWX family of pumps consists of designs to API OH3, OH4 and OH5 configurations for meeting customer specific needs.

The most stringent emissions containment is achieved as the API 682 seal chambers accommodate all mechanical seal styles including advanced gas barrier seal technology.

The HWX pump is the industry leader for these reasons:

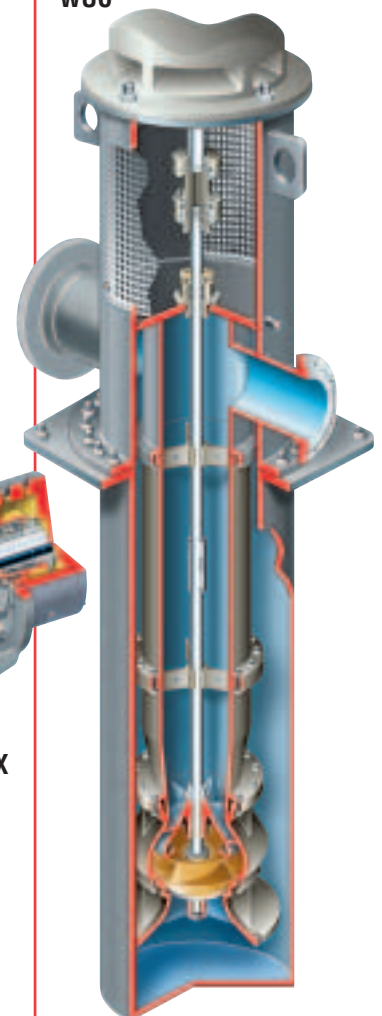
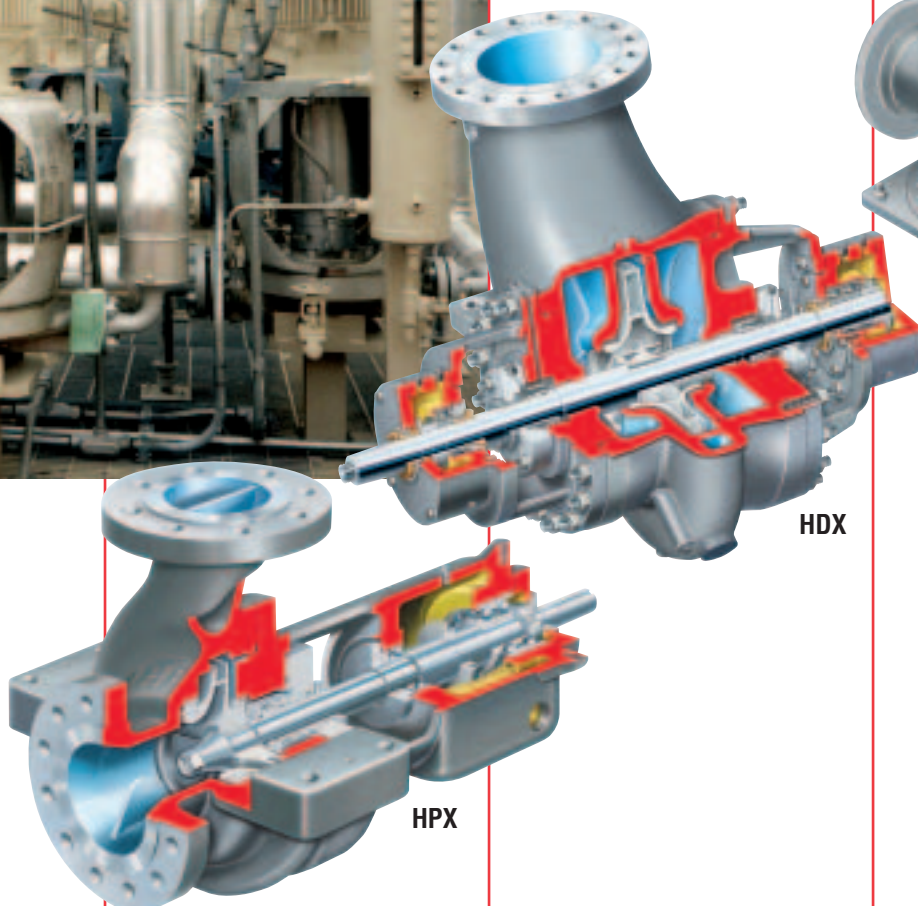
- Robust construction to meet pressure, temperature, nozzle loading and safety considerations required by API 610 and other industry or user specifications
- Most comprehensive hydraulic coverage in the industry
- Variety of materials and bearing housing lubrication options
- Completely removable, back pull-out design
- Low flow/high head hydraulic options
  - OH3: HWM, HWM-2
  - OH4: MSP
  - OH5: WM, WM-2
- Customized hydraulics
  - OH4: DSVP
  - OH5: PVML, PVML-Mag Drive
- Rigid coupled design
  - OH4: W

**Complementary Pump Designs**

HWX pumps may be used with other Flowserve models of API design. These include:

- Single stage, horizontal overhung pumps
- Single and two stage between bearing pumps
- Multistage between bearing pumps
- Vertical, double casing pumps

**VTP-Can**  
**WUC**



**HWX  
API 610  
Vertical In-Line  
Process Pumps**

The Flowserve HWX pump line meets or exceeds the rigorous requirements of API 610, latest edition. It encompasses a family of eleven distinct designs providing the most comprehensive range of pump configurations and hydraulic coverage available to the industry.

These space-saving pumps are engineered and built for reliable and safe performance in cryogenic, high temperature and high working pressure services.

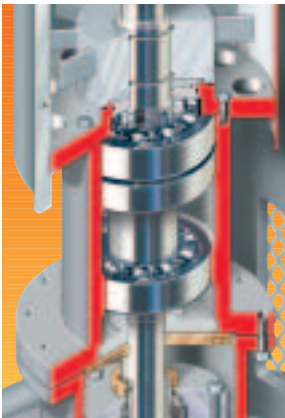
**Special HWX OH3 Features**

- Choice of bearing lubrication type
  - Oil cascade lube design for temperatures to 385°C (725°F)
  - Oil mist design for temperatures to 400°C (750°F)
  - Grease lube design for temperatures to 275°C (525°F)
- Only two bearing housing frames and bearing sets for all OH3 pumps
- Top bearing isolator, optional Inpro

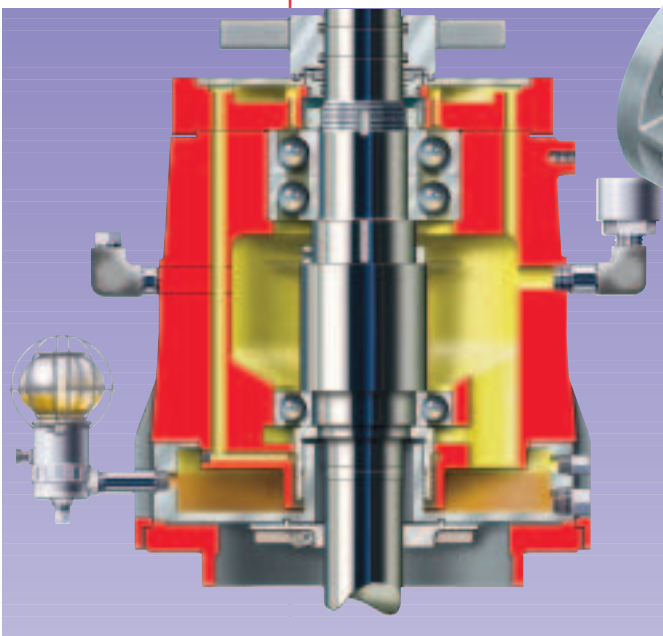
- Flexible disc spacer coupling design
- Standard fan air cooling for grease and oil sump bearing housings. Fan cooling not applicable or needed for oil mist designs
- Complete back pull-out design
- Accommodates NEMA, IEC and existing field drivers (C-face and P-base)

**Operating Parameters**

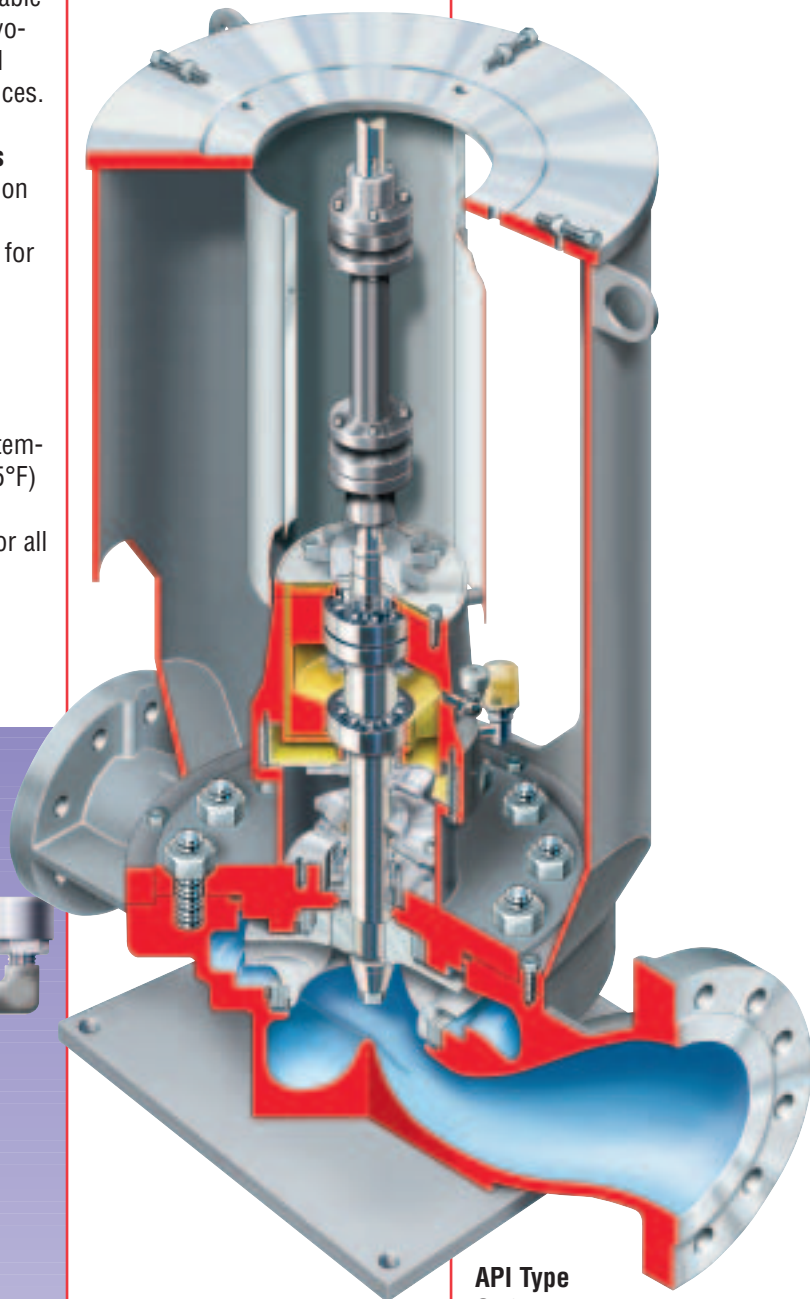
- Flows to 3400 m<sup>3</sup>/h (15 000 gpm)
- Heads to 900 m (3000 ft)
- Temperatures from -185°C (-300°F) to 400°C (750°F)
- Pressures to 100 bar (1450 psi)



**Grease and Oil Mist Bearing Housing Design**



**Oil Cascade Design Detail**



**API Type OH3 with Patented Oil Cascade Lube Bearing Housing Design**



### HWX Line Features

**API 682 Seal Chamber** accommodates a wide variety of seal configurations including dual pressurized and unpressurized cartridge types for the most severe services. A full complement of API 610 seal flush plans is available. Shaft sleeve and gland plate constructed of stainless steel for optimum seal life

**Cartridge Seal Mounting** assures:

- Ease of maintenance
- Precise seal face setting for maximum seal life

**Fan Cooling\*** of bearing housing permits handling of extreme temperatures without the need for water cooling

\* Not applicable or needed for oil mist designs

**Raised Face Flanges** are to ASME B16.5 for Class 300. Surface finish meets API 610 standard. ISO flanges and flanges with JIS drilling are available

**Pump Casing and Cover** feature metal to metal fit with fully confined, controlled compression gasket to ensure proper sealing and alignment

**Back Pull-Out** of rotating assembly for OH3 and OH4 models simplifies maintenance as neither the motor nor piping connections are disturbed

**Standardized Mounting Plate** is provided to maintain the API 3:1 ratio from the unit center of gravity to prevent tipping. Larger plates provided as required to accommodate mounting of seal pot assemblies and heat exchangers

**Motor Support Head** is a heavy-duty design with a registered fit motor mount. Generous size open compartments allow easy access to all bolting and removal of the complete pumping assembly, including mechanical seal, without removal of casing

**Adjustable Axial Screws** allow for easy driver mount positioning and are provided where dowelling of driver is not possible or practical

**Coupling Guard** is provided to enclose the coupling, pump shaft and motor shaft areas

**Dynamically Balanced Impeller** limits vibration and assures smooth operation over wide flow range

- Casting techniques and manufacturing processes for fine finish, high efficiency
- Positively locked, anti-rotation impeller nut with threads unexposed to pumped liquid

**Renewable Wear Rings\*** for both the casing and impeller reduce replacement cost

- Secured by axial screws, with option for tack welding
- Back wear ring standard
- Rear rings and balance holes eliminated for high suction pressure applications

\* Not applicable or needed for low flow impeller designs

**Stiff Shaft Design** limits maximum deflection at seal faces to 0.05 mm (0.002 in maximum). Shaft stiffness factors ( $L^3/D^4$ ) are the best in the industry

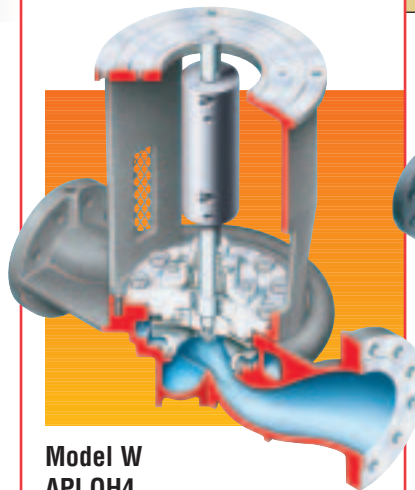
### Options and Technical Data

Flowserve offers vertical in-line pumps in all configurations and sizes to meet all service conditions, preferences and budgets. Each model is fully compliant with API 610, latest edition.

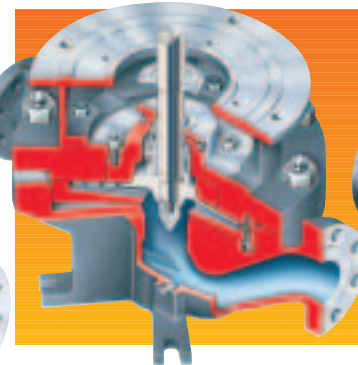
Options include customized hydraulics, using volute inserts/diffusers, radial blade impellers, inducers and double suction impellers.

### Available In-Line Pump Designs

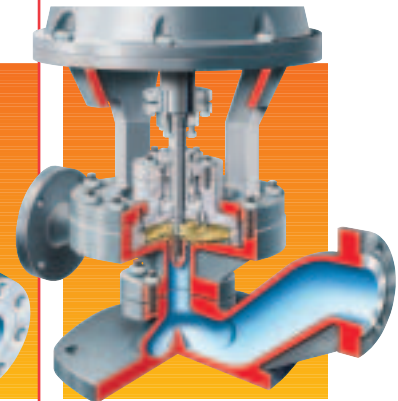
API Code	Design Type	Single Stage	Two Stage
OH 3	Flexible Coupled with Pump Bearing Housing	HWX	
	Flexible Coupled with Pump Bearing Housing, Low Flow Impeller, Volute Insert	HWM	HWM-2
OH 4	Rigid Coupled Fixed Speed	W	
	Rigid Coupled Variable Speed Low Flow/High Head with VFD	MSP	MSP
	Rigid Coupled Double Suction Impeller	DSVP	
OH 5	Extended Motor Shaft with Low Flow Impeller, Volute Insert	WM	WM-2
	Extended Motor Shaft Diffuser Casing	PVML	
	Extended Motor Shaft Diffuser Casing Magnetic Drive	PVML-MAG	



**Model W**  
API OH4  
Rigid Coupled

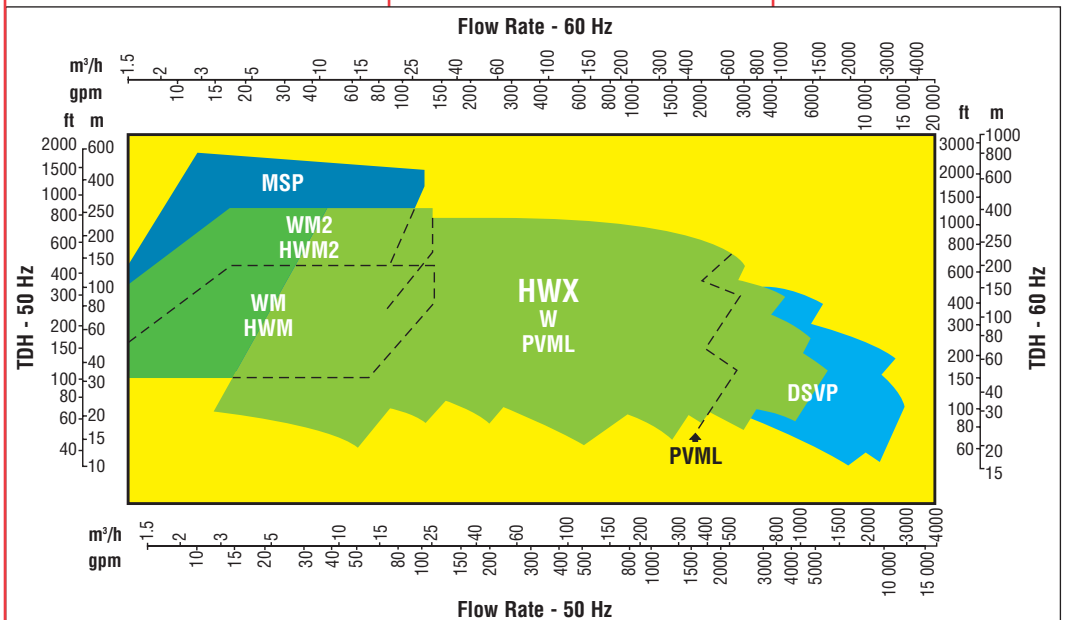


**Model WM**  
API OH5  
Extended Motor Shaft



**Model MSP**  
API OH4  
Rigid Coupled  
Variable Speed

### HWX Range Chart

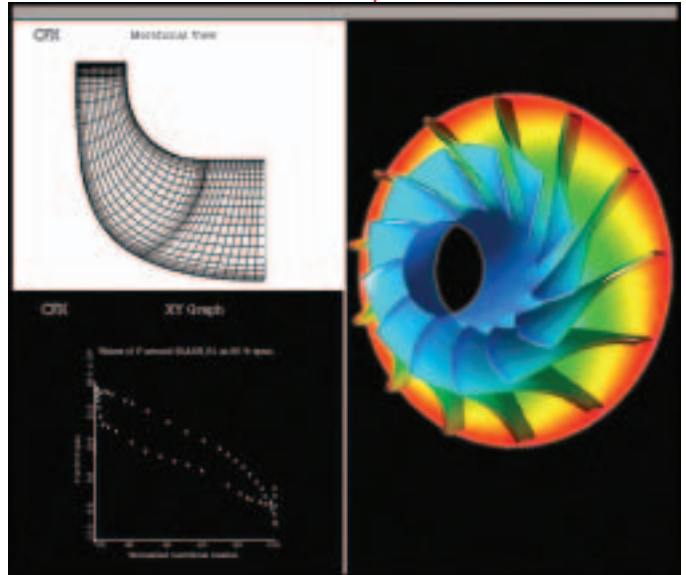
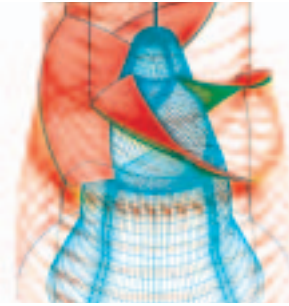


**Global Service and Technical Support**

**Advanced Technologies**

Few if any pump companies can match Flowserve's capabilities in hydraulic and mechanical design or in materials engineering. These capabilities include:

- Computational fluid dynamics
- Flow visualization
- Cavitation studies
- Efficiency optimization
- Finite element analysis
- Rapid prototyping
- Captive high nickel alloy and light reactive alloy foundries
- Non-metallic materials processing and manufacturing



**Service and Repair Group**

Flowserve's Service and Repair Group is dedicated to maximizing equipment performance and reliability-centered maintenance programs. Pump related services include:

- Startup and commissioning
- Diagnostics and prognostics
- Routine and repair maintenance
- ANSI and ISO power end exchange program
- Re-rates, upgrades and retrofits
- Spare parts inventory and management programs
- Training



**Pump Improvement Engineering Services**

Flowserve is committed to helping customers obtain the best possible return on their pump equipment investment. Engineering assistance and technological solutions for pumping problems are readily available.

These services include:

- Field performance testing
- Vibration analysis
- Design analysis and root-cause problem solving
- Material improvements
- Pump and system audit
- Advanced technology solutions
- PumpTrac™ remote pump monitoring and diagnostic services
- Instruction manual updates
- Training courses

**Flowserve... Supporting Our Customers  
With The World's Leading  
Pump Brands**



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